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## Context matters when striving to promote active and lifelong learning in medical education

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**WHERE DO WE STAND NOW?** In the 30 years that have passed since The Edinburgh Declaration on Medical Education, we have made tremendous progress in research on fostering ‘self-directed and independent study’ as propagated in this declaration, of which one prime example is research carried out on problem-based learning. However, a large portion of medical education happens outside of classrooms, in authentic clinical contexts. Therefore, this article discusses recent developments in research regarding fostering active learning in clinical contexts.

**SELF-REGULATED, LIFELONG LEARNING IN MEDICAL EDUCATION** Clinical contexts are much more complex and flexible than classrooms, and therefore require a modified approach when fostering active learning. Recent efforts have been increasingly focused on understanding the more complex subject of supporting active learning in clinical contexts. One way of doing this is by using theory regarding self-regulated learning (SRL), as well as situated learning, workplace affordances, self-determination theory and achievement goal theory. Combining

these different perspectives provides a holistic view of active learning in clinical contexts.

### ENTRY TO PRACTICE, VOCATIONAL TRAINING AND CONTINUING

**PROFESSIONAL DEVELOPMENT** Research on SRL in clinical contexts has mostly focused on the undergraduate setting, showing that active learning in clinical contexts requires not only proficiency in metacognition and SRL, but also in reactive, opportunistic learning. These studies have also made us aware of the large influence one’s social environment has on SRL, the importance of professional relationships for learners, and the role of identity development in learning in clinical contexts. Additionally, research regarding postgraduate lifelong learning also highlights the importance of learners interacting about learning in clinical contexts, as well as the difficulties that clinical contexts may pose for lifelong learning. However, stimulating self-regulated learning in undergraduate medical education may also make postgraduate lifelong learning easier for learners in clinical contexts.

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WHERE DO WE STAND?

Thirty years ago, The Edinburgh Declaration on Medical Education was published by the World Federation for Medical Education.<sup>1</sup> This declaration originated from a conference where the results from a global inquiry on medical education were discussed and which identified 12 improvements to be achieved for medical education in the future. This article discusses where we stand now and how we can proceed, focusing on one of the recommendations: 'Ensure continuity of learning throughout life by shifting emphasis from the didactic methods so widespread now to self-directed and independent study as well as tutorial methods'.<sup>1</sup> In this article, we will discuss current knowledge on promoting active learning in medical education and introduce some theoretical frameworks that may foster the understanding of active learning. By doing so, we aim to move beyond discussing active learning in a specific setting, and to provide a discussion about active learning and lifelong learning as a doctor in a broader variety of contexts, emphasising more complex ones such as clinical contexts.

To ensure continuity in lifelong learning, it is important to understand what active lifelong learning is, what it entails, and how one can foster the development of lifelong learning. A definition often used to describe lifelong learning is: 'the development of human potential through a continuously supportive process which stimulates and empowers individuals to acquire the knowledge, values and skills and understanding they will require throughout their lifetimes and apply them with confidence, creativity, and enjoyment in all roles, circumstances, and environment.'<sup>2</sup> This definition by Longworth and Davies emphasises how lifelong learning is a continuous process of employing metacognitive skills to acquire and use cognitive and non-cognitive competencies in different situations. In other words, it is imperative for a lifelong learner to always actively engage in one's own learning in different circumstances and contexts.<sup>3</sup> This implies that lifelong learning is a great responsibility for the individual. However, it does not imply that active lifelong learning is a solely individual, cognitive, process. On the contrary, actively engaging in learning is a process influenced by both person and context.<sup>4</sup>

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LEARNING IN CONTEXT

As Ellaway and Bates have argued, it is important to systematically describe what context entails to enable critical engagement and advance understanding of learning in such contexts.<sup>5</sup> Following a constructivist theory on learning, meaning that humans construct knowledge and meaning from their experiences, we can define context to be: an occasional, relational property between objects or activities that arises from activity and which features are defined dynamically.<sup>6</sup> Therefore context includes what people do in a context, the roles that people have in a context, interpersonal relationships, and the physical context in which learners learn. This results in a context that is not static but rather flexible, emergent, dynamic and changing, and can be interpreted differently by individuals.<sup>7,8</sup> This explains why learners in different contexts may engage in active learning very differently. How learners engage in active learning will in turn also effect their contexts.<sup>9</sup> For example, in a recent empirical study, one medical student explained how being the sole student in the context of a clinical ward was beneficial for his active learning because it allowed freedom in deliberately choosing learning opportunities. By contrast, another medical student felt that being the sole student on a ward limited her learning opportunities because there were no possibilities to talk to other students, which was one of her main strategies for learning in a clinical ward.<sup>7</sup> As hospital staff responded differently to these students, this created a complex chain of events and subsequent changes in learning behaviour, exemplifying how context and individual both effect active learning.

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SELF-REGULATED LIFELONG LEARNING IN MEDICAL EDUCATION

**Entry to practice**

In the 30 years since the Edinburgh Declaration, we have learned a lot about how to facilitate learners to actively engage in their own learning in classroom contexts.<sup>10</sup> A prime example of this is the vast amount of research regarding problem-based learning (PBL), which emphasises learning as being a self-directed, contextual, constructive and collaborative process.<sup>11–14</sup> In PBL, learners get challenged with professionally relevant problems regarding a certain topic, which they need to

research and then debate and discuss within a small group, rather than being given all relevant information regarding a certain topic. Researchers generally tend to agree that PBL has a positive effect on active learning and learning outcomes, but that it also depends on other factors than the instructional method of PBL, such as students' motivation for PBL, the quality and level of the problems presented to them, and the faculty members that work with the students.<sup>15</sup> More recently, team-based learning (TBL) has been gaining attention. Studies on TBL also show high student engagement in their own education, and it requires less time from faculty members as it combines certain aspects of small- and large-group learning.<sup>16–19</sup>

By contrast with classroom learning, little is known about how to facilitate active engagement in lifelong learning in contexts other than those dedicated to learning, for instance the clinical workplace.<sup>20,21</sup> This is important because a major part of medical education happens within clinical contexts and those are not intrinsically suited for active learning.<sup>22</sup> Additionally, active engagement in lifelong learning in clinical contexts requires modified learning strategies compared with classroom contexts.<sup>7</sup> Therefore, in the remainder of this article we will focus on facilitating (the development of) lifelong learning competencies within clinical contexts.

Clinical contexts have some unique features not found in many other contexts, which relate to the prime focus of a clinical context, which is to provide patient care, and to the belief that learning in a clinical context largely takes place by participating in activities regarding patient care.<sup>23</sup> Learning and patient care should be intertwined in these contexts, because not doing this may harm the embodiment of knowledge.<sup>24</sup> The clinical context is therefore also shaped by: the care of patients, physical settings, supervision from senior staff members and other health care professionals, the curriculum in which learners are enrolled and peers involved.<sup>5</sup>

### *Self-regulated learning*

One way of trying to understand active engagement in lifelong learning in such a personal, social and ever-changing context is by using self-regulated learning (SRL) theories.<sup>25–33</sup> A widely used definition of SRL, overarching separate but related theories, is that: 'Self-regulated learning

is the modulation of affective, cognitive and behavioral processes throughout a learning experience to reach a desired level of achievement'.<sup>34</sup> SRL consists of various regulatory processes, which can be categorised as: regulatory agents (goal setting), regulatory mechanisms (planning, monitoring, metacognition, attention, learning strategies, persistence, time management, environmental structuring, help-seeking, motivation, emotion control and effort) and regulatory appraisals (self-evaluation, attributions and self-efficacy).<sup>34</sup> Traditionally, this was theorised as an orderly, cyclical (meta)cognitive process. However, recent findings in SRL research advocate that SRL processes are not purely individual, but also highly dependent on context and therefore SRL should be regarded as such.<sup>34–38</sup> SRL theories originated from settings in which certain goals are set for the learner, by contrast with lifelong learning where learners must determine many goals themselves.<sup>39</sup> However, the vast majority of skills required for self-regulated learning are also vital for effective lifelong learning.<sup>3,39,40</sup> Therefore, to understand more about developing and supporting lifelong learning in medical education, it is interesting to understand how learners self-regulate their learning. Besides using theory on self-regulated learning, it is helpful to use multiple theories to study active learning because this aids a more holistic, comprehensive understanding of it.<sup>41</sup> Therefore we will also discuss self-regulated lifelong learning in medical education from a broader perspective using other theories. The key theories used are defined and summarised in Table 1.

Self-regulated learning is traditionally regarded as a planned, orderly, cyclical, (meta)cognitive process initiated by goal setting. However, part of SRL can be opportunistic and reactive to the ever-changing context it takes place in.<sup>7</sup> This means that for medical students in a clerkship, there is a spectrum of how students engage themselves in self-regulated, lifelong learning. At one end of the spectrum there is traditional, planned, cyclical self-regulated learning, initiated by the goals of a learner. At the other end of the spectrum there is a reactive form of self-regulated, lifelong learning that is initiated by reacting to opportunistic learning activities that present themselves. This means that besides being able to self-regulate planned learning, medical students learning in clinical contexts are also required to adapt to their context and utilise a flexible, opportunistic variant of self-regulated learning.

Table 1 Key theories and definitions

Key theories	Definition
Achievement goal theory <sup>76</sup>	Achievement goal theory addresses the issue of the purpose of or reason why an individual pursues a task as well as the standards or criteria they use to evaluate their competence or success in the task. The term 'goal orientation' is used to represent the idea that achievement goals are not just simple target goals or more general goals, but represent a general orientation to tasks that includes a number of related beliefs about purposes, competence, success, ability, effort, errors and standards.
Constructivist theory on learning <sup>100</sup>	Constructivist theories on learning suggest that learning is an interpretive, recursive, nonlinear building process by active learners interacting with their surroundings, and the physical and social world. It describes how structures, language, activity and meaning making come about, rather than simply characterising the structure and stages of thought, or isolating behaviours learned through reinforcement.
Self-determination theory <sup>71,72</sup>	Self-determination theory (SDT) is concerned with the motivation behind choices people make without external influence and interference. SDT focuses on the degree to which an individual's behaviour is self-motivated and self-determined. The fulfillment of three main intrinsic needs is required for self-determination: competence, autonomy and psychological relatedness.
Self-regulated learning <sup>101,102</sup>	Self-regulated learning emphasises autonomy and control by a learner who monitors, directs and regulates actions toward goals of information acquisition, expanding expertise and self-improvement. Self-regulated learners are aware of their academic strengths and weaknesses, and they have a repertoire of strategies they appropriately apply to tackle the day-to-day challenges of academic tasks.
Situated learning <sup>44</sup>	Situated learning theory describes how individuals acquire professional skills and how legitimate peripheral participation leads to membership in a community of practice. Situated learning 'takes as its focus the relationship between learning and the social situation in which it occurs'.
Workplace affordances <sup>65</sup>	Workplace affordances identifies factors that shape how learning proceeds in workplaces, how workplaces afford opportunities for learning and how individuals elect to engage in work activities. The readiness of the workplace to afford opportunities for individuals to engage in work activities and access support is a key determinant of the quality of learning in workplaces.

One of the most important elements influencing how learners self-regulate their learning is relationships with others<sup>7,8,22</sup> Social interactions have, at least for medical students at the clerkship level, proved to be important influences because students' SRL strategies very frequently involve asking questions, asking for feedback or discussing learning goals<sup>8,42</sup> Who students involve in their SRL depends on their social network, and in a clinical context this network can expand and change over time.<sup>8</sup> Students who are new to a clinical context may have relatively limited social capital and involve only a few people in their SRL because they can feel insecure about their role in a certain context.<sup>43</sup> This means they only interact with a few people

regarding what their learning goals could be and what strategies they could use to achieve those goals, and gather feedback from these few people to self-reflect on their progress. Consequently, the vagaries of a single resident, peer or consultant can have a major impact on students' SRL and can make learning thrive or diminish. More experienced students on the other hand often have a larger social network and therefore the influence a single person has on their SRL is smaller. These students are able to navigate and understand the clinical community and all of its members and know what their role in the process of patient care can be. Subsequently, they know what to do in patient care and how to learn from that. More experienced



students are therefore more resilient in suboptimal learning contexts and can better cope with transitions.

### *Situated learning*

That social relationships are such an important issue in medical students' SRL in clinical contexts can also be understood using situated learning concepts.<sup>44,45</sup> This notion describes how learners learn in the workplace through legitimate peripheral participation in a community of practice. By gradually taking up meaningful activities, trainees learn to think, act and feel like doctors. During this process, they will become full members of a clinical community of practice and collaborate in daily activities.<sup>46,47</sup> This helps them to develop a new identity, first as a medical trainee and ultimately as a medical professional.

Learners who are new to a clinical context are in an active struggle to manage themselves, at least partially, because they are in the process of constructing their professional identities in that context.<sup>48,49</sup> To do this, learners need to be able to acclimatise to a context. Learners need to feel like a valuable member of a clinical community, by thinking, acting and feeling like a future doctor, and deciding what they believe it is to be an academic and a good doctor. Therefore, helping learners to engage in effective SRL in a clinical context begins with helping them to understand what learning is and what effective learning strategies are in a clinical context, and helping learners create a clear idea of what kind of professional identity they want to develop. This can be achieved in a multitude of ways; however, a constructive learning climate is essential, and learners need to be engaged in professional socialisation, and the formation of professional relationships to facilitate social interactions needs to be stimulated.<sup>46,50,51</sup> Forming professional relationships requires time and the possibility to participate in patient care.<sup>22</sup> We suggest that it is therefore highly important to foster a safe learning environment, without rotating learners between departments too often, to enable them to develop professional relationships in a certain context.

Situated learning therefore strengthens the case for longitudinally integrated clerkships (LICs), because ongoing participation facilitates learners' understanding of a clinical community of practice, and consequently what a learner's role in a team might be. Research regarding LICs has also shown

benefits in practice, reporting deeper relationships between students and staff, supporting the identity development process, more active involvement in a team, and better learning outcomes.<sup>52–56</sup> These studies on LICs have also highlighted the importance of context for fostering active learning. Additionally, LICs are suitable to provide scaffolded support because faculty members can get to know individual students and better understand individual students' needs. Mentoring, mapping and using microanalysis protocols to gain an insight into learners' current engagement in SRL may provide insight into the needs of learners, which may prove to be especially important for learners who are struggling.<sup>57–63</sup> Using this knowledge to engage in a form of co-regulated learning from the onset of clinical learning, with generally decreasing support over time (both within a single clerkship and throughout the curriculum), seems promising.<sup>37,64</sup>

### *Workplace affordances*

Literature about workplace affordances can aid our understanding of how opportunities have a major influence on a learner's engagement in SRL in a clinical context.<sup>7,65,66</sup> Workplace affordances describe the engagement opportunities and invitational qualities of the workplace.<sup>65</sup> Workplace affordances include readily available opportunities for learners, possibilities for a learner to create opportunities, and teaching practices.

Similar to workplace affordances, opportunities are an important influence on SRL in a clinical context. Literature on both SRL and workplace affordances has pointed out that learner agency is important for a learner's learning opportunities in a clinical context, once again emphasising the interplay between individual and context.<sup>67</sup> Learner agency can create workplace affordances by asking for learning opportunities or by advocating for yourself.<sup>67</sup> In SRL in clinical contexts this has also been described as a 'creating learning opportunities' approach.<sup>68</sup> Workplace affordances are influenced by learners interacting with activities, artefacts, tools, aims, goals, procedures, values and norms of a context.<sup>69</sup> Similarly, these influences proved to be important aspects of how a clinical context and students can interact to influence students' SRL.<sup>4,7,37</sup> Using theory regarding workplace affordance, self-regulated learning, and other theories such as those described in Table 1, together helps us understand how active learning in a clinical context works.

### *Self-determination*

In other vocational contexts, the outcomes of SRL are greatly affected by motivation.<sup>34</sup> From an educational point of view this makes sense, because intrinsic motivation is positively associated with learning and academic performance.<sup>70</sup> Self-determination theory describes how intrinsic motivation requires three psychological needs: autonomy, a feeling of relatedness, and a feeling of competence.<sup>71,72</sup> A result of this is that supporting autonomy can foster self-determination and intrinsic motivation. Autonomy is also a major factor influencing engagement in SRL in a clinical context and many studies have highlighted that students need to feel like a true member of a clinical team to learn in a clinical context.<sup>9,22,47,54,73–75</sup> These can be considered to be the appearances of an ultimate need for a feeling of relatedness and self-efficacy. Such a need for relatedness has never been described in SRL theories, but makes sense when combined with self-determination theory. In one of our studies on SRL in clinical contexts, the importance of relatedness and relationships for SRL was also evident.<sup>8</sup> Just like SRL, relatedness is inextricably linked to context, because to have a sense of relatedness other people need to be present. Therefore, also from a self-determination theory viewpoint, context matters in supporting active learning.

### *Achievement goals*

Context also affects what goals learners set for themselves in their SRL, because certain goals can be forced upon learners, such as getting a certain grade on a test or performing a procedure a set number of times. Achievement goal theory gives insight into what goals learners set for themselves in SRL, because it helps in understanding why learners may decide to work on specific goals and why they may expect better results from pursuing some of their own goals, rather than those of a curriculum.<sup>76,77</sup> Achievement goal theory aims to answer how learners approach learning using three types of goals. These goals can either be learning-oriented or performance-oriented. Learning-oriented goals aim for achieving excellence. Performance-oriented goals are classified differently in various theories, but generally can aim to make a good impression (proving goal orientation; performance-approach goal orientation), aim to avoid looking incompetent (avoiding goal orientation; performance-avoid orientation), be intrinsically driven to perform (relative ability goal

orientation) or extrinsically driven to perform (extrinsic goal orientation).<sup>76–81</sup> Research using achievement goal theory has studied how different goals lead to varying degrees of adaptive learning behaviour, self-regulation, self-efficacy and performance.<sup>81</sup> Learners aiming for learning-oriented goals showed most adaptive learning behaviour, higher self-regulation, higher self-efficacy and better performance. Learners who set relative ability goals also show adaptive learning behaviour, high self-regulation, high self-efficacy and good performance. Learners with extrinsic goals showed maladaptive learning behaviour, low self-regulation, low self-efficacy and lower performance.<sup>81</sup> Therefore, it appears plausible that having learners focus on learning rather than performance in a vocational context will be beneficial to their SRL and subsequent active learning outcomes. Likewise, social relationships once again may be key here because having learners be afraid to appear inferior to others and continuously having to prove themselves, is likely to be detrimental for subsequent SRL and active learning outcomes.<sup>82</sup>

### **Vocational training phase**

The importance of active lifelong, self-regulated learning has also been gaining attention in the vocational training phase of doctors.<sup>83</sup> In this phase, junior doctors in their postgraduate years are trained to work more independently and to eventually become consultants. Even though the literature studying how to support active lifelong learning in vocational training is less abundant than for undergraduate medical education, there is certainly evidence that active educational methods are effective in changing doctors' performance and patients' health.<sup>84</sup> This is especially well researched regarding more technical and procedural skills such as cardiac life support skills and lumbar punctures in postgraduate simulation training.<sup>85–88</sup> Besides technical skills, other competencies, such as professionalism, may also benefit from more active self-regulated learning.<sup>46,89</sup> This is not surprising, as residents or interns learn, similar to medical students in clinical environments, through work-related activities and through interpretation of experiences and social interaction.<sup>90</sup> Multiple studies on residents' active learning in clinical contexts have highlighted the importance of scaffolding their learning opportunities to foster their feelings of competence and autonomy, similar to medical students.<sup>91,92</sup> Other studies have shown additional similarities, such as how residents' active learning in clinical contexts also varies to include

both planned and reactive learning,<sup>93</sup> how questions of others (such as the patient) may be strong motivators for goal setting in active learning,<sup>94</sup> and how individualised learning plans may be helpful to support active learning.<sup>94</sup>

To guide this learning, vocational training curricula have often been using competency frameworks to plan lifelong learning activities.<sup>95</sup> However, learners in vocational training are known to struggle with this.<sup>96,97</sup> Learners in vocational training reported understanding how valuable self-regulated lifelong learning is, but experienced a lack of skills to manage their own learning, and would value more traditional teacher-centred approaches.<sup>96</sup> This is understandable because much of their undergraduate education was likely to be teacher centered and learners have adjusted their own learning strategies to this. Additionally, learners may feel that patient care and learning are competing priorities.<sup>96</sup> However, there might be a shift taking place in recent years, as more recent studies indicate that postgraduate trainees engage in self-regulated learning before, during and after patient encounters, and deliberately use feedback on their performance and engage in reflection to guide their learning.<sup>98</sup> This might indicate that the efforts to make undergraduate medical education more active, self-regulated and learner centred are also having an effect on postgraduate learning.

One of the most recent innovations in vocational training has been the introduction of entrustable professional activities (EPAs). EPAs are 'units of professional practice, defined as tasks or responsibilities to be entrusted to the unsupervised execution by a trainee once he or she has attained sufficient specific competence'.<sup>99</sup> In practice, EPAs are used to assess what level of supervision a trainee requires in performing a specific professional activity. EPAs aim to achieve a more flexible, individualised curriculum, but also allow for granting trainees full responsibility for specific tasks they have proven to be entrustable and competent in.<sup>70</sup> From a self-determination theory point-of-view, the implementation of EPAs is also likely to improve active learning as it may nourish feelings of competence and autonomy.

### Continuing professional development

There is very little research that has specifically been aimed towards understanding how to facilitate

doctors' active lifelong learning in clinical contexts. However, it is evident that social relationships such as those described in situated learning theory, and self-reflection on real issues encountered in a doctor's life whilst practising medicine, are essential for the acquisition and improvement of competencies.<sup>46</sup> This has been studied for both medical-technical and more generic competencies.<sup>89</sup> Besides self-reflection, which is incorporated into self-regulated learning theory, other studies have shown how a feeling of competence and autonomy (as described in self-determination theory) is important in fostering clinicians' autonomous self-regulation.<sup>70</sup> Feeling competent and the autonomy to guide one's own professional practice not only led to self-regulation, but also an actual change in behaviour and time spent on learning.<sup>70</sup> Even though active lifelong learning in continuing professional development remains an area that requires further study, the limited evidence available leads us to believe it may not be very different from learners still in training in a clinical context. Therefore, it is likely to be very useful to study doctors' continuing professional development in clinical contexts specifically, and the opportunities and burdens this context may contain, as well as using multiple theoretical perspectives to try and grasp the issue more holistically.

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### CONCLUSION

Medical education has made tremendous progress in 'ensuring continuity of learning throughout life by shifting emphasis from the didactic methods so widespread now to self-directed and independent study as well as tutorial methods'.<sup>1</sup> Besides much research on pre-clinical active learning such as problem-based learning, recent efforts have been increasingly focused on the more complex subject of supporting active learning in clinical contexts. The effects of these efforts, such as the implementation of more longitudinal integrated clerkships, on the development of learners' SRL competencies and lifelong learning are yet to be studied. However, it has become clear that active and lifelong learning in clinical contexts is challenging, requires both metacognitive skills and the ability to learn opportunistically, and should be fostered. One issue that repeatedly arises from studies regarding active learning in clinical contexts, including undergraduate learning, vocational training and continuing professional development, is how beneficial social interaction is for active and



lifelong learning, and that discussions about learning between trainees and professionals should be stimulated.

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